

**United States Patent** [19]**Gazard et al.**[11] **Patent Number:** **4,502,934**[45] **Date of Patent:** **Mar. 5, 1985**

[54] **ELECTRODE COMPRISING AN ELECTROCHROME POLYMER FILM AND A DISPLAY DEVICE USING SUCH AN ELECTRODE**

[75] **Inventors:** Maryse Gazard; Gérard Tourillon; Francis Garnier, all of Paris, France

[73] **Assignee:** Thomson-CSF, Paris, France

[21] **Appl. No.:** 499,789

[22] **Filed:** May 31, 1983

[30] **Foreign Application Priority Data**

Jun. 1, 1982 [FR] France ..... 82 09512

[51] **Int. Cl.<sup>3</sup>** ..... C25B 9/00; G02F 1/01

[52] **U.S. Cl.** ..... 204/242; 204/290 R; 350/357

[58] **Field of Search** ..... 350/357; 252/408; 204/290 R, 242

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

4,304,465 12/1981 Diaz ..... 350/357

**FOREIGN PATENT DOCUMENTS**

27855 5/1981 European Pat. Off. .

36118 9/1981 European Pat. Off. .

94536 8/1969 France .

**OTHER PUBLICATIONS**

Extended Abstracts No. 427, 1980, A. F. Diaz et al., "Electro-Synthesis and Study of Conducting Organic Polymers for Electrode Applications."

IBM Technical Disclosure Bulletin, vol. 24, No. 11A,

Apr. 1982, "Poly-p-Nitrophenylpyrrole Films as Electrodes for Batteries."

Chemical Abstracts, vol. 93, 1980, 56812d, A. F. Diaz et al.: "Chemical Modification of a Polypyrrole Electrode Surface."

Journal of Polymer Science, Polymer Letters Edition, vol. 18, 1980, Yamamoto et al., "Preparation of Thermostable and Electric-Conducting Poly(2,5-Thienylene)."

Chemical Abstracts, vol. 91, 1979, 141759v, Tourillon et al., "Electrochemical Doping of Poly(THF) Thin Films Deposited on the Platinum Electrode: XPS and SIMS."

*Primary Examiner*—John F. Niebling  
*Attorney, Agent, or Firm*—Oblon, Fisher, Spivak, McClelland & Maier

[57] **ABSTRACT**

The invention relates to the elaboration of an electrode comprising an electrochrome polymer.

The invention provides an electrode coated with a polymer film obtained by electrochemical polymerization of a monomer M, said polymer corresponding to the general formula  $(M+X^{-})_n$  where  $X^{-}$  represents an anion coming from the electrolyte used for the polymerization, the monomer being either a substituted aromatic heterocycle with 5 links containing a single heteroatom, or an indole substituted on the phenyl nucleus, the substitutions being possibly groups of the alkyl, alkoxyl, hydroxyl, aryl, substituted aryl, halogene, trihalogenomethyl, cyano, amino or dialkylamino type.

**24 Claims, 5 Drawing Figures**

